UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/629,675	07/29/2003	Richard M. H. New	HSJ920030169US1	6409

7590   04/19/2006

John L. Rogitz
Rogitz & Associates
Suite 3120
750 B Street
San Diego, CA 92101

EXAMINER
GENTRY, DAVID G

ART UNIT	PAPER NUMBER
2114	

DATE MAILED: 04/19/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _29 July 2003_.

2a)☐ This action is **FINAL.**   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle,* 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-29_ is/are pending in the application.

     4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-19,21-23,25-27 and 29_ is/are rejected.

7)☒ Claim(s) _20,24 and 28_ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _29 July 2003_ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

     a)☐ All b)☐ Some * c)☐ None of:

       1.☐ Certified copies of the priority documents have been received.

       2.☐ Certified copies of the priority documents have been received in Application No. _____.

       3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

     * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 17, 21, and 25 are rejected under 35 U.S.C. 102(e) as being anticipated

by Belsan et al. (U.S. Patent No. 5,632,012).

As per claim 17, Belsan discloses a hard disk drive, comprising:

at least one storage disk (column 4, lines 40-50);

at least one drive controller reading data from and writing data to the disk

(column 13, lines 6-8; Note: the disk drive subsystem represents the drive controller),

the drive controller executing logic comprising:

executing a scrub cycle including: reading at least one data unit (column 12, line

65- column 13, line 6);

determining whether an error exists in the data unit (column 12, line 65- column

13, line 6), and if so, undertaking at least one of:

recording the error (column 15, lines 59-62);

executing the reading and determining logic for subsequent data units, wherein

the scrub cycle is executed on first data that has been written more recently than

second data, and then is executed on the second data (column 2, lines 58-67; Note: it is

understood that the priority scrub routine is more timely than the all-encompassing

routine).

As per claim 21, Belsan discloses a hard disk drive, comprising:

at least one storage disk (column 4, lines 40-50);

at least one drive controller reading data from and writing data to the disk

(column 13, lines 6-8; Note: the disk drive subsystem represents the drive controller),

the drive controller executing logic comprising:

executing a scrub cycle including:

reading at least one data unit, the data unit being preferentially selected for the

scrub if it is immediately adjacent on the disk to data that has been subject to a user

request (column 13, lines 45-63; Note: the periodic scrubbing procedure shows that the

scrubbing operation is continuing throughout the entire sector);

determining whether an error exists in the data unit (column 12, line 65- column

13, line 6), and if so, undertaking at least one of:

recording the error (column 15, lines 59-62);

executing the reading and determining logic for subsequent data units (column

13, lines 45-63; Note: the periodic scrubbing procedure shows that the scrubbing

operation is continuing throughout the entire sector).

As per claim 25, Belsan discloses a hard disk drive, comprising:

at least one storage disk (column 4, lines 40-50);

at least one drive controller reading data from and writing data to the disk

(column 13, lines 6-8; Note: the disk drive subsystem represents the drive controller),

the drive controller executing logic comprising:

executing a scrub cycle including:

reading at least one data unit; determining whether an error exists in the data unit

(column 12, line 65- column 13, line 6), and if so, undertaking at least one of:

recording the error (column 15, lines 59-62);

executing the reading and determining logic for subsequent data units, wherein

the scrub cycle is executed on areas of the disk that have been more frequently

accessed than other, less frequently used areas, and then is executed on the less

frequently used areas (column 2, lines 58-67; Note: it is understood that the more

frequently used areas will have their priority flags set more often, and therefore will have

priority over less frequently used areas).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1, 3-9, 11-16, 18, 22, and 26 are rejected under 35 U.S.C. 103(a) as

being unpatentable over Belsan in view of Pfeffer et al. (U.S. Patent No. 5,210,860)

As per claim 1, Belsan discloses a hard disk drive, comprising:

at least one storage disk (column 4, lines 40-50);

at least one drive controller reading data from and writing data to the disk

(column 13, lines 6-8; Note: the disk drive subsystem represents the drive controller),

the drive controller executing logic comprising:

executing a scrub cycle including: reading at least one data unit (column 12, line

65- column 13, line 6);

determining whether an error exists in the data unit (column 12, line 65- column

13, line 6), and if so, undertaking at least one of:

recording the error (column 15, lines 59-62);

executing the reading and determining logic for subsequent data units (column

13, lines 45-63; Note: the periodic scrubbing procedure shows that the scrubbing

operation is continuing throughout the entire sector).

Belsan fails to disclose a disk drive where the scrub cycle is interrupted.

Pfeffer discloses a disk drive with a scrubbing process (column 6, lines 25-35) comprising:

if a user request for at least one of: a data read, and a data write, is received, interrupting the scrub cycle to fulfill the request, and then resuming the scrub cycle (column 6, lines 46-51).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to include the interrupt method as described by Pfeffer in the hard disk drive described by Belsan. It would have been obvious because Pfeffer allows the scrubbing technique to continue without affecting normal disk operations (column 6, lines 46-51).

As per claim 3, Pfeffer discloses a disk drive comprising waiting a delay period after fulfilling all user requests in a user request queue prior to resuming the scrub cycle (column 6, lines 51-54).

As per claim 4, Pfeffer discloses a disk drive wherein the delay period is an adaptive delay period that depends on at least one of:

a frequency, and a number, of user requests received from the RAID controller (column 11, lines 57-62; Note: the delay period depends on the user request to change the TIMER period).

As per claim 5, Belsan discloses a disk drive wherein the disk drive is partitioned into data bands, the drive controller maintaining a table indicating at least recent accesses to bands (column 16, lines 61-64).

As per claim 6, Belsan discloses a disk drive comprising executing the scrub

cycle on data immediately adjacent on the disk to data that is subject to a user request, as part of fulfilling the request (column 17, lines 6-9).

As per claim 7, Belsan discloses a disk drive comprising executing the scrub cycle on first data that has been written more recently than second data, and then scrubbing the second data (column 2, lines 58-67; Note: it is understood that the priority scrub routine is more timely than the all-encompassing routine).

As per claim 8, Belsan discloses a disk drive comprising executing the scrub cycle on areas of the disk that have been more frequently accessed than other, less frequently used areas, and then scrubbing the less frequently used areas (column 2, lines 58-67; Note: it is understood that the more frequently used areas will have their priority flags set more often, and therefore will have priority over less frequently used areas).

As per claim 9, Belsan discloses a hard disk drive, comprising:

at least one storage disk (column 4, lines 40-50);

at least one drive controller reading data from and writing data to the disk (column 13, lines 6-8; Note: the disk drive subsystem represents the drive controller), the drive controller executing logic comprising:

executing a scrub cycle including: reading at least one data unit (column 12, line 65- column 13, line 6);

determining whether an error exists in the data unit (column 12, line 65- column 13, line 6), and if so, undertaking at least one of:

recording the error (column 15, lines 59-62);

executing the reading and determining logic for subsequent data units (column

13, lines 45-63; Note: the periodic scrubbing procedure shows that the scrubbing

operation is continuing throughout the entire sector).

Belsan fails to disclose a disk drive where the scrub cycle is interrupted.

Pfeffer discloses a disk drive with a scrubbing process (column 6, lines 25-35)

comprising:

if a user request for at least one: a data read, and a data write, is received, and if

a current scrub rate exceeds a threshold rate, interrupting the scrub cycle to fulfill the

request, and then resuming the scrub cycle, and otherwise not interrupting at least an

existing scrub read of the scrub cycle (column 6, lines 46-51).

It would have been obvious to a person of ordinary skill in the art at the time the

invention was made to include the interrupt method as described by Pfeffer in the hard

disk drive described by Belsan. It would have been obvious because Pfeffer allows the

scrubbing technique to continue without affecting normal disk operations (column 6,

lines 46-51).

As per claim 11, Pfeffer discloses a disk drive comprising waiting a delay period

after fulfilling all user requests in a user request queue prior to resuming the scrub cycle

(column 6, lines 51-54).

As per claim 12, Pfeffer discloses a disk drive wherein the delay period is an

adaptive delay period that depends on at least one of:

a frequency, and a number, of user requests received from the RAID controller

(column 11, lines 57-62; Note: the delay period depends on the user request to change

the TIMER period).

As per claim 13, Belsan discloses a disk drive wherein the disk drive is partitioned into data bands, the drive controller maintaining a table indicating at least recent accesses to bands (column 16, lines 61-64).

As per claim 14, Belsan discloses a disk drive comprising executing the scrub cycle on data immediately adjacent on the disk to data that is subject to a user request, as part of fulfilling the request (column 17, lines 6-9).

As per claim 15, Belsan discloses a disk drive comprising executing the scrub cycle on first data that has been written more recently than second data, and then scrubbing the second data (column 2, lines 58-67; Note: it is understood that the priority scrub routine is more timely than the all-encompassing routine).

As per claim 16, Belsan discloses a disk drive comprising executing the scrub cycle on areas of the disk that have been more frequently accessed than other, less frequently used areas, and then scrubbing the less frequently used areas (column 2, lines 58-67; Note: it is understood that the more frequently used areas will have their priority flags set more often, and therefore will have priority over less frequently used areas).

As per claim 18, Belsan fails to disclose a disk drive where the scrub cycle is interrupted.

Pfeffer discloses a disk drive with a scrubbing process (column 6, lines 25-35) comprising:

if a user request for at least one: a data read, and a data write, is received,

interrupting the scrub cycle to fulfill the request, and then resuming the scrub cycle

(column 6, lines 46-51).

It would have been obvious to a person of ordinary skill in the art at the time the

invention was made to include the interrupt method as described by Pfeffer in the hard

disk drive described by Belsan. It would have been obvious because Pfeffer allows the

scrubbing technique to continue without affecting normal disk operations (column 6,

lines 46-51).

As per claim 22, Belsan fails to disclose a disk drive where the scrub cycle is

interrupted.

Pfeffer discloses a disk drive with a scrubbing process (column 6, lines 25-35)

comprising:

if a user request for at least one: a data read, and a data write, is received,

interrupting the scrub cycle to fulfill the request, and then resuming the scrub cycle

(column 6, lines 46-51).

It would have been obvious to a person of ordinary skill in the art at the time the

invention was made to include the interrupt method as described by Pfeffer in the hard

disk drive described by Belsan. It would have been obvious because Pfeffer allows the

scrubbing technique to continue without affecting normal disk operations (column 6,

lines 46-51).

As per claim 26, Belsan fails to disclose a disk drive where the scrub cycle is

interrupted.

Pfeffer discloses a disk drive with a scrubbing process (column 6, lines 25-35) comprising:

if a user request for at least one: a data read, and a data write, is received, interrupting the scrub cycle to fulfill the request, and then resuming the scrub cycle (column 6, lines 46-51).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to include the interrupt method as described by Pfeffer in the hard disk drive described by Belsan. It would have been obvious because Pfeffer allows the scrubbing technique to continue without affecting normal disk operations (column 6, lines 46-51).

Claims 2, 10, 19, 23, 27, and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Belsan in view of Pfeffer in further view of Lester et al. (U.S. Patent No. 6,715,116).

Belsan and Pfeffer are relied upon for reasons stated in the previous section.

As per claims 2, 10, 19, 23, and 27, Belsan and Pfeffer fail to disclose a disk drive that is a RAID drive.

Lester discloses a hard disk drive with a scrubbing operation that is a RAID drive (column 9, lines 21-29).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to include the RAID system as described by Lester in the hard drive described by Belsan and Pfeffer. It would have been obvious because RAID systems are a commonly used storage method used in the art.

Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pfeffer

in view of Rodcheffer et al. (U.S. Patent No. 6,848,063) in further view of Lester.

Pfeffer discloses a system comprising a controller and a plurality of hard disck

drives, the drive controller for each drive autonomously executing a scrub cycle on its

disks and, if a user request for at least one of: a data read, and a data write, is received,

interrupting the scrub cycle to fulfill the request, and then resuming the scrub cycle.

Pfeffer fails to disclose a disk drive where each memory subunit has the scrub

operation controlled by the memory subcontroller.

Rodcheffer discloses a controller and a plurality of memory subunits, each

subunit including at least one storage disk and at least one drive controller reading data

from and writing data to the subunit (figure 1, items 16-2, 16-4), wherein the drive

controller for each disk drive is coupled to the main controller (figure 1, item 40).

It would have been obvious to a person of ordinary skill in the art at the time the

invention was made to include the method of controlling the scrubbing operation

through the subcontrollers as described by Rodcheffer in the system described by

Pfeffer. It would have been obvious because Rodcheffer allows a faster scrub rate as

the scrubbing operations are performed in parallel (column 4, lines 39-48).

Pfeffer and Rodcheffer fail to disclose a disk drive that is a RAID system.

Lester discloses a hard disk drive with a scrubbing operation that is a RAID drive

(column 9, lines 21-29).

It would have been obvious to a person of ordinary skill in the art at the time the

invention was made to include the RAID system as described by Lester in the hard drive

described by Belsan and Pfeffer. It would have been obvious because RAID systems are a commonly used storage method used in the art.

Allowable Subject Matter

Claims 20, 24, and 28 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David G. Gentry whose telephone number is (571) 272-2570. The examiner can normally be reached on M-F 8-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Scott Baderman can be reached on (571) 272-3644. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the
Patent Application Information Retrieval (PAIR) system. Status information for
published applications may be obtained from either Private PAIR or Public PAIR.
Status information for unpublished applications is available through Private PAIR only.
For more information about the PAIR system, see http://pair-direct.uspto.gov. Should
you have questions on access to the Private PAIR system, contact the Electronic
Business Center (EBC) at 866-217-9197 (toll-free).

ROBERT BEAUSOLIEL
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100